REMARKS

Claims 1, 3, 5-9 and 11-13 are amended herein. Claims 1-14 remain pending in the application.

The Applicant respectfully requests the Examiner to reconsider earlier rejections in light of the following remarks. No new issues are raised nor is further search required as a result of the changes made herein. Entry of the Amendment is respectfully requested.

Claims 1-4 and 6-14 over Myers in view of Matsumoto

In the Office Action, claims 1-4 and 6-14 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over Myers, U.S. Patent No. 4,817,149 ("Myers") in view of Matsumoto et al., U.S. Patent No. 5,381,482 ("Matsumoto"). The Applicant respectfully traverses the rejection.

Claims 1-4 and 6 recite, *inter alia,* a first digital delay module <u>in series</u> with a second digital delay module, respectively providing a first <u>digital integer value</u> resolution and an additional <u>digital fractional delay</u> that are **added** together to create a perceived positional sound. Claims 7-14 recite, *inter alia,* **adding** a selected first digital time delay and a second digital time delay, respectively representing an <u>digital integer value</u> and a <u>digital fractional delay</u>, to create a perceived positional sound.

Myers appears to disclose an artificial, three dimensional auditory display which artificially imparts localization cues to a multi-frequency component electronic signal sound source (Abstract). The signal is split into two signals with one of them being delayed by a selected amount <u>not greater than 0.67 milliseconds</u> (Myers, Abstract). A plurality of head localization time delays are used in conjunction with variable time delays to impart an azimuth cue (Myers, Fig. 20; col. 13, lines 36-53). An audio position control computer 200 controls the application of the **analog** time delays to the two signals (Myers, Fig. 1).

Myers discloses an audio position control computer that controls various time delays to create exact return directions and vectorizing (col. 15, lines 50-53). However, the various time delays are **NOT** disclosed as being

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digital time delays, much less digital time delays that are in series and added together, as recited by claims 1-4 and 6-14.

The Office Action relies on Matsumoto to allegedly make up for the deficiencies in Myers to arrive at the claimed invention. The Applicant respectfully disagrees.

Matsumoto appears to disclose a sound field controller for generating apparent sound sources by adjusting an amplitude and delay time of a sound signal so that the sound will be perceived by a plurality of listeners (Abstract). An embodiment uses integer delay values in one path of a sound signal and fractional delay values in a second separate path of the sound signal (Fig. 4, items 32, 33, 41 and 42).

Although Matsumoto discloses using an integer delay and a fractional delay for a sound system, the delays are used in separate paths of a sound signal. The integer delay and fractional delay are NOT in series to be added together to create a perceived positional sound, as recited by claims 1-4 and 6-14.

Neither Myers nor Matsumoto, either alone or in combination, disclose, teach or suggest adding digital delay values, a digital integer delay and a digital fractional delay, much adding a first digital delay and a second digital delay that are in series to create a perceived positional sound, as recited by claims 1-4 and 6-14.

The Examiner argues that Myers is not relied on to teach that the first and second delay modules are digital delay modules, which is met by Matsumoto (Office Action, page 7). Moreover, the Examiner argues that Matsumoto is not relied on to teach adding the integer and the fractional delays, which is met by Myers (Office Action, page 7). The Examiner alleges that it is the combination of Myers and Matsumoto, rather than Myers and Matsumoto individually, that meet the claimed first and second delay modules being digital delay modules and adding integer and fractional delays (Office Action, page 7).

The Examiner's alleged modification of Myers with components from Matsumoto, i.e., modifying an analog time delay system with digital components is nonsensical. Analog components and digital components are not

interchangeable from one system to another. Modifying an analog time delay system with digital components would leave the analog system <u>inoperable</u>.

Even if it were obvious to modify Myers with Matsumoto (which it is not) Matsumoto fails to disclose <u>digital delays</u> that area <u>in series</u> and <u>added</u> together. Matsumoto discloses using an integer delay and a fractional delay for a sound system, however, the delays are used in <u>separate</u> paths of a sound signal, **NOT** <u>in series</u> to be <u>added</u> together, as recited by claims 1-4 and 6-14.

Moreover, modifying Myers with Matsumoto would, if such a system would somehow work), <u>at best</u> result in an <u>analog</u> sound delay system that splits a signal into two signal paths, with both paths delaying the sound signal <u>not greater than 0.67 milliseconds</u> with **further use** of digital integer delay values in one path of a sound signal and fractional delay values in a <u>second **separate** path</u> of the sound signal. Use of a plurality of delays from <u>both systems</u> would result in a theoretical system having <u>too much delay</u>, **NOT** resulting in a system providing a properly perceived 3D positional sound.

Moreover, "Teachings of references can be combined <u>only</u> if there is some suggestion or incentive to do so." <u>In re Fine</u>, 5 USPQ2d 1596,1600 (Fed. Cir. 1988) (quoting <u>ACS Hosp. Sys. v. Montefiore Hosp.</u>, 221 USPQ 929, 933 (Fed. Cir. 1984)) (emphasis in original). Neither Myers nor Matsumoto provide any suggestion or incentive to modify an analog system with digital components that would <u>completely change the structure of the system</u> from one using parallel delay paths to one that uses digital delays <u>in series</u> that are <u>added</u> together.

As discussed in the background of the invention, conventional 3D sound systems employing delay use analog components. There are at least two basic problems with the implementation of the conventional analog approach in a digital environment. First of all, a large resolution in the available time delays cause discretely sampled interaural time differences for the expected position of a listener. Thus, a 'closest' or 'best fit' interaural time difference (ITD) must be chosen, which may be up to 50% away from the ideal parameter. This may cause a jittering effect in the sense of movement of the sound by the listener. Moreover, implementation of a digital filter emulating an analog filter having

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multiple taps (as shown Applicant's Fig. 6) is computationally involved, providing a level of system inefficiency from a computational view.

Furthermore, with a conventionally proposed implementation of a digital 3D sound system to provide a more accurate ITD based on the given resolution has been to interpolate an entire head-related transfer function (HRTF) set such that the ITD becomes interpolated as well. Unfortunately, interpolation itself can become a computationally intense requirement which likely adds to, rather than cures, the computational inefficiency otherwise associated with digital 3D sound systems. Applicant's invention overcomes the deficiencies in the cited prior art by using two digital delays, an <u>integer</u> and a <u>fractional</u> delay, **added** together to created a perceived positional sound.

Accordingly, for at least all the above reasons, claims 1-4 and 6-14 are patentable over the prior art of record. It is therefore respectfully requested that the rejection be withdrawn.

Claim 5 over Myers in view of Matsumoto and Nagata

In the Office Action, claim 5 was rejected under 35 U.S.C. §103(a) as allegedly being obvious over Myers in view of Matsumoto, and further in view of Nagata, U.S. Patent No. 5,974,154 ("Nagata"). The Applicant respectfully traverses the rejection.

Claim 5 is dependent on claim 1, and is allowable for at least the same reasons as claim 1.

Claim 5 recites, *inter alia,* a first digital delay module <u>in **series**</u> with a second digital delay module, respectively providing a first <u>digital integer value</u> resolution and an additional <u>digital fractional delay</u> that are **added** together to create a perceived positional sound.

As discussed above, neither Myers nor Matsumoto, either alone or in combination, disclose, teach or suggest **adding** an <u>digital integer delay</u> and a <u>digital fractional delay</u> that are <u>in **series**</u> to create a perceived positional sound, as recited by claim 5.

The Office Action correctly acknowledged that Myers and Matsumoto fails to disclose an integer and fractional delay selector adapted to

determine a first time delay for use by a first delay module and an additional fractional delay for use in a second delay module (Office Action, page 6). The Office Action relies on Nagata to allegedly make up for the deficiencies in Myers and Matsumoto to arrive at the claimed invention. The Applicant respectfully disagrees.

Nagata appears to disclose an echo effector for imparting an echo effect to an audio signal based on values of a plurality of parameters (Abstract). A dial is actuated for independently setting one or more of the parameters to desired values (Nagata, Abstract). A microprocessor dependently sets the remaining parameters to appropriate values according to the desired values (Nagata, Abstract). A first delay unit has a plurality of output terminals which output stepwise delayed signals having setpwise different delay times (Nagata, col. 4, lines 60-62). A second delay unit, connected to the first delay unit, outputs from terminals delayed signals having stepwise different delay times (Nagata, col. 5, lines 24-26). A switch group or matrix, a plurality of dials, and a command switch are used to for setting and selecting the amount of echo effect (Nagata, col. 5, lines 6-10).

Nagata teaches adding <u>echo</u> effect to an audio signal. A system for adding <u>echo</u> to an audio signal is **NOT** a <u>3D audio sound system</u>. Moreover, <u>echo</u> does not create a <u>perceived positional sound</u>. Nagata fails to disclose or suggest **adding** <u>digital delay values</u>, a <u>digital integer delay</u> and a <u>digital fractional delay</u>, much <u>adding</u> a first <u>digital delay</u> and a second <u>digital delay</u> that are <u>in series</u> to create a perceived positional sound, as recited by claim 5.

Neither Myers, Matsumoto nor Nagata, either alone or in combination, disclose, teach or suggest **adding** <u>digital delay values</u>, a <u>digital integer delay</u> and a <u>digital fractional delay</u>, much <u>adding</u> a first <u>digital delay</u> and a second <u>digital delay</u> that are <u>in series</u> to create a perceived positional sound, as recited by claim 5.

Accordingly, for at least all the above reasons, claim 5 is patentable over the prior art of record. It is therefore respectfully requested that the rejection be withdrawn.

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Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the subject application is in condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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